

RESEARCH DEPARTMENT

**TRANSMITTING AERIALS FOR THE OKEHAMPTON V.H.F. TELEVISION
AND V.H.F. SOUND STATION**

Technological Report No. RA-2/4
UDC 621.396.712 1967/16

R.D.C. Thoday, A.M.I.E.R.E.
D.W. Osborne, M.I.E.E.

H Tagg
for Head of Research Department

This Report is the property of the
British Broadcasting Corporation and
may not be reproduced in any form
without the written permission of the
Corporation.

This Report uses SI units in accordance with B.S. document PD 5686.

April 1967

Technological Report No. RA-2/4
UDC 621.396.712

1967/16

TRANSMITTING AERIALS FOR THE OKEHAMPTON V.H.F. TELEVISION AND V.H.F. SOUND STATION

INTRODUCTION

The new Okehampton relay station came into operation on 12th September 1966. It provides a television and v.h.f. sound service to Okehampton and to small communities to the south and south-east of the town. It replaces the existing station, sited at Hilltown Cross, which was removed from service at the start of the new transmissions.

SUMMARY OF INSTALLATION

Site: The site is at West Hook, approximately 1.6 km north of Okehampton, grid reference SX 586967, height 210 m a.m.s.l.

Support Structure: The support structure consists of a 36.6 m (120 ft) self supporting tower oriented with one face on bearing 90° ETN

General Arrangement: See Fig. 1.

Band I

Channel: Channel 4 with vertical polarization is used. The vision carrier is offset -16.875 kHz and the sound carrier -20 kHz.

Aerial: The aerial¹ consists of two tiers of single vertical three element Yagis oriented to give maximum radiation on a bearing of 184° ETN. The Yagis are fed with equal co-phased currents. The inter-tier spacing is 1.0λ and the mean aerial height 29.9 m (98 ft) a.g.l. There are independent feeders to each Yagi.

Power: A single 10 watt translator is used.

Templet and horizontal radiation pattern (h.r.p.): See Fig. 2 and note.

Gain: Mean intrinsic gain 3.4 dB

Deduct: loss due to distribution feeder and possible misalignment 0.2 dB

Mean net gain 3.2 dB

Deduct: loss in main feeder type RPC 2603 1.2 dB

Network loss 0.6 dB 1.8 dB

Mean effective gain 1.4 dB

Band II

Carrier Frequencies: 88.7 (Light), 90.9 (Third) and 93.1 (Home) MHz.

Aerial: The aerial¹ consists of two tiers, each having two horizontal $\frac{\Delta}{2}$ dipoles, oriented on bearings 149° and 239° ETN and spaced 1.17 m (3 ft 10 in.) from the tower axis. The dipoles are fed with equal co-phased currents. The inter-tier spacing is 0.7λ and the mean aerial height 35.4 m (116 ft) a.g.l. There are independent main feeders to each tier.

Power: A 10 watt translator is used for each programme.

Templet and h.r.p.: See Fig. 3 and note.

| | | |
|-------|--|-----------------------------|
| Gain: | Mean intrinsic gain | 1.6 dB |
| | <u>Deduct:</u> loss due to distribution feeder and possible misalignment | <u>0.2 dB</u> |
| | Mean net gain | 1.4 dB |
| | <u>Deduct:</u> loss in main feeder type RPC 2603 | 1.6 dB |
| | Network loss | <u>0.9 dB</u> <u>2.5 dB</u> |
| | | <u>-1.1 dB</u> |

Programme Sources: Both television and v.h.f. sound programmes are obtained by direct pick-up of the transmission from North Hessary Tor. Protection against corona discharge interference with the television reception is provided by a 100 mm (4 in.) diameter metal ball, which surmounts the aerial support tower.

Note: The h.r.p.s of the Band I and II aerials were obtained from small-scale model measurements.

REFERENCES

1. Detailed information on the construction and dimensions of the aerials is given on the following drawings held by BBC Transmitter Planning and Installation Department.

| | |
|----------------|--|
| PID 7822.2.3A4 | Arrangement of Aerials on 120 ft Tower |
| PID 8732.2.4A2 | Band I Yagi Type 353 P |
| PID 8732.2.1D | Band II Transmitting Dipole |
| PID 8732.2.5A2 | Band II Receiving Yagi |

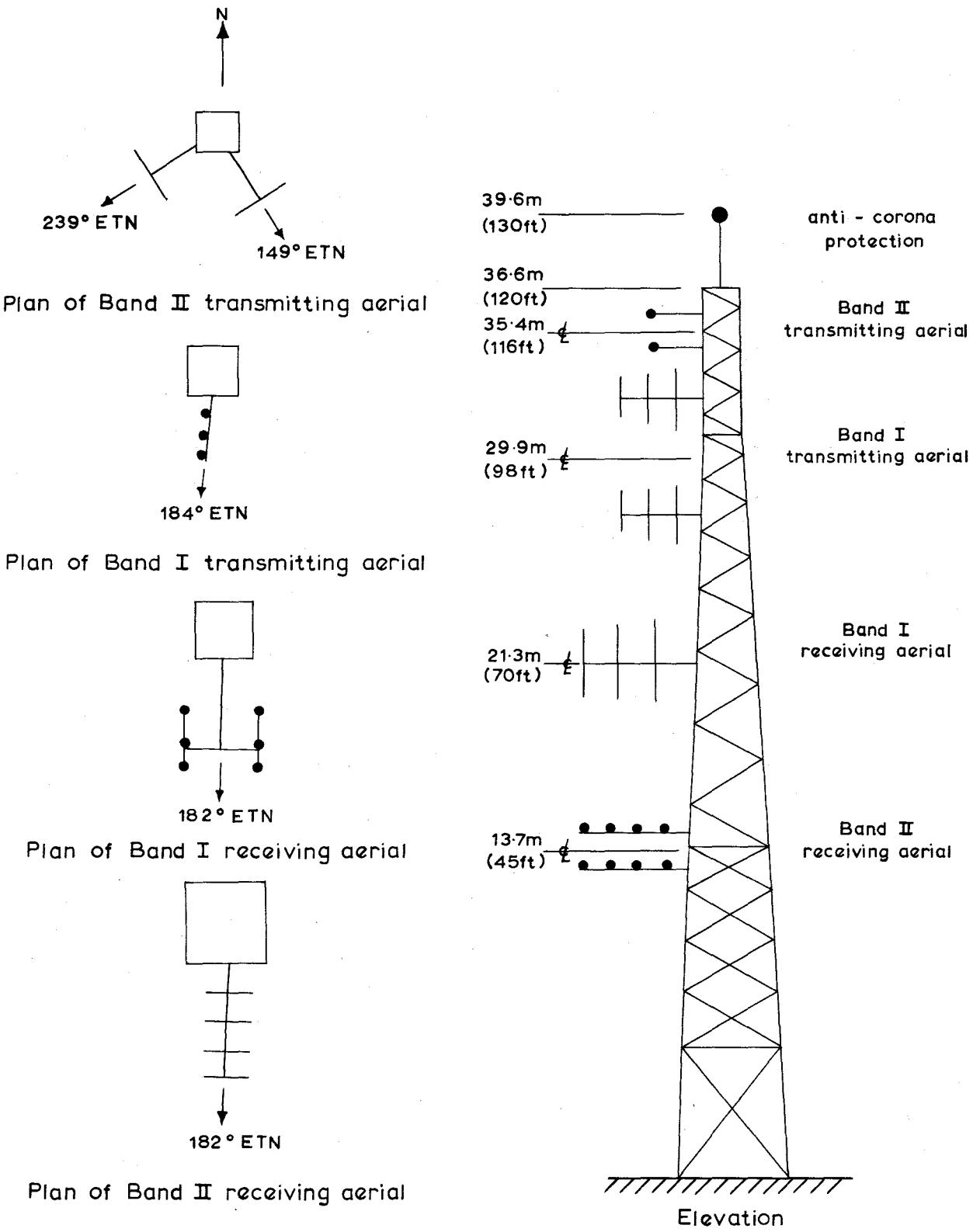
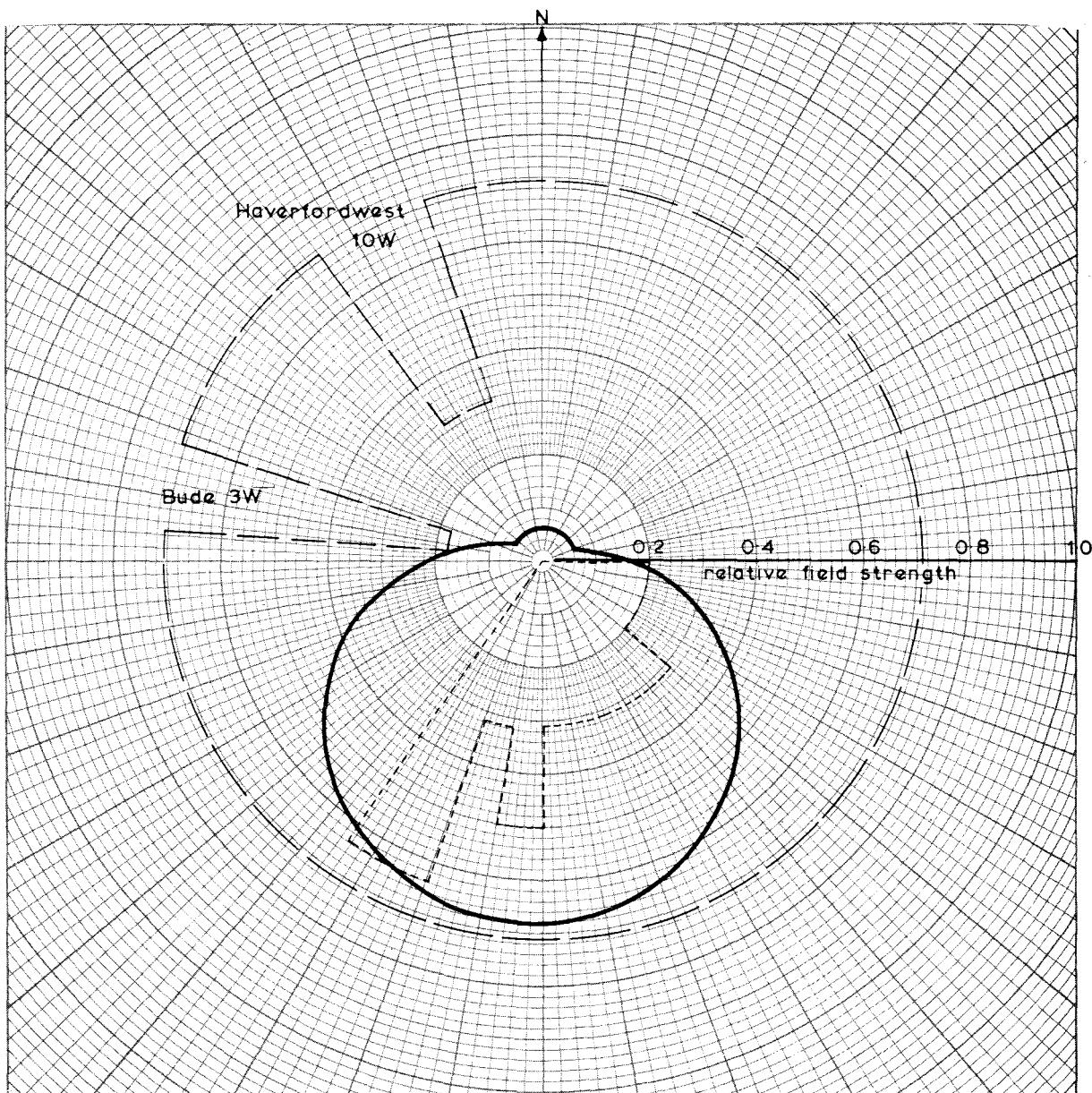


Fig.1. General arrangement of aerials on tower.



**Fig.2. Band I templet and horizontal radiation pattern
VERTICAL POLARIZATION**

Channel 4 (Vision carrier 61.75 MHz, Sound carrier 58.25 MHz)
 Mean effective gain: 1.4 dB ——— Maximum permissible E.R.P.
 Transmitter power : 10W ----- Minimum desirable E.R.P.
 Mean E.R.P. : 13.8 W
 Unit field corresponds to an E.R.P. of 100 W

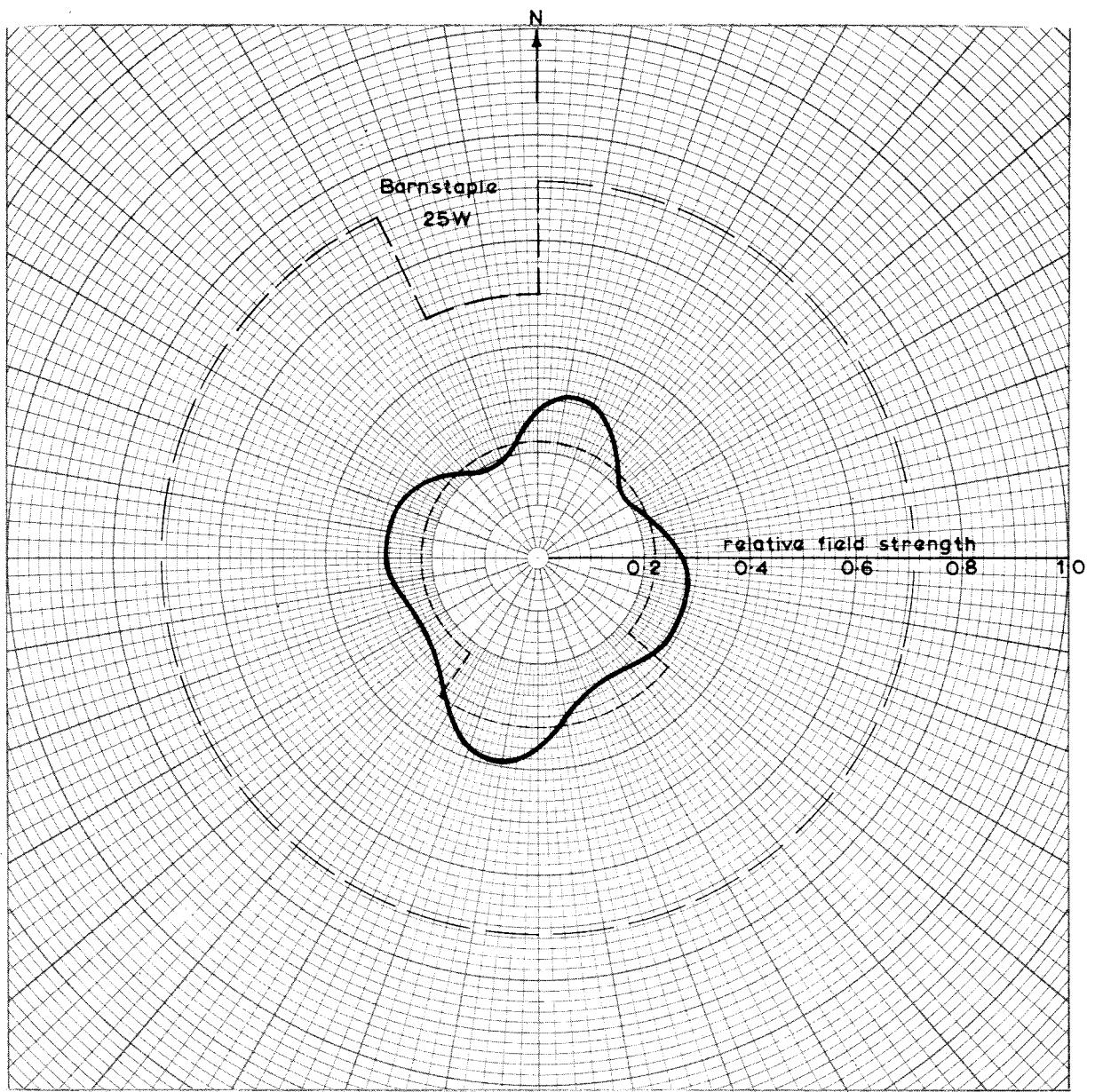


Fig.3. Band II templet and horizontal radiation pattern

HORIZONTAL POLARIZATION

88.7 (Light), 90.9 (Third), 93.1 (Home) MHz

Mean effective gain : -1.1dB ——— Maximum permissible E.R.P.

Transmitter power : 10W ----- Minimum desirable E.R.P.

Mean E.R.P. : 7.8 W

Unit field corresponds to an E.R.P. of 100W